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METHOD OF DETERMINATION OF SHATTER INDEX OF IRON ORE LUMPS, SINTERS AND PELLETS

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METHOD OF DETERMINATION OF SHATTER INDEX OF IRON ORE LUMPS, SINTERS AND PELLETS

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Indian Standard

METHOD OF DETERMINATION OF SHATTER INDEX OF IRON ORE LUMPS, SINTERS AND PELLETS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 October 1981, after the draft finalized by the Ores and Raw Materials Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 With the advancement of blast furnace technology, assessment of the quality and behaviour of blast furnace burden, has assumed considerable importance. This standard is one of such standards, and gives a method of determining the behaviour of iron ore lumps, sinters and pellets during feeding into blast furnace.

0.3 In the preparation of this standard, assistance has been derived from document ISO/TC 102/SC 3 (IT-13) 452 E Determination of Shatter Index of Sinters, prepared by International Organization for Standardization.

0.4 In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

1. SCOPE

1.1 This standard specifies a method for the determination of resistance during free fall of iron ore lumps, sinters and pellets.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

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*Rules for rounding off numerical values (*revised*).

2.1 Resistance to Free Fall — Resistance to shattering shown by the iron ore lumps, sinters and pellets during free fall. It is defined by the quantity of material which, after being tested, retains a size range over a specified dimension.

3. PRINCIPLE OF TEST

3.1 A sample of sinter, ore or pellets with specified weight and dimensions, is placed in a container in such a way that it can be lifted up to a specified height of 2 m and then allowed to fall freely on to a steel plate.

4. SAMPLE

4.1 The sample to be tested shall be 20 ± 0·2 kg in mass and of size range 5 to 40 mm for iron ore lumps and sinters, and of size range 9 to 16 mm for iron ore pellets. The sample shall be dried thoroughly at a temperature of 105 ± 5°C in a drying oven.

NOTE — The samples to be tested shall be representative of the size distribution of the general sample.

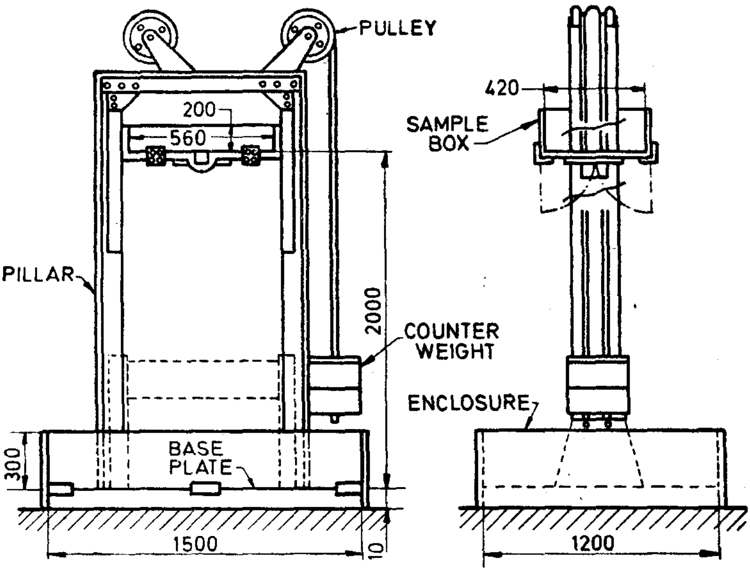
5. EQUIPMENT

5.1 The container shall be of dimensions 560 × 420 × 200 mm with a dropable bottom and shall be attached to a stand, so that the container after filling of the sample may be easily lifted to a height of 2 m, where it can stay during dropping of the sample (*see* Fig. 1).

5.2 The base plate of the test stand made of steel shall be 10 mm or over in thickness, 1 200 mm in width and 1 500 mm in length, and its outside shall be surrounded by an enclosure 300 mm in height (*see* Fig. 1). The base plate shall be anchored to a frame and shall rest on a sand layer.

6. PROCEDURE

6.1 The dried sample shall be weighed out and placed gently into a container with bottom closed and tightly fixed. The container shall be raised by the mechanical device on the stands, so that the bottom of the container is at a height of 2 m from the steel plate. The height shall be checked carefully. The bottom of the containter shall then be allowed to drop and the sample spurting outside the plate shall be collected. The collected sample shall be filled back into the container and the whole operation should be repeated three more times. Finally, the sample shall be collected and sieved through 10 mm and 5 mm sieves. The sieved fractions shall be weighed and the shatter index calculated on the basis of the original mass of the sample.



All dimensions in millimetres.

FIG. 1 SHATTER TEST APPARATUS

6.1.1 If the difference between the total of the fraction mass and the mass of the sample before testing exceeds 1 percent of the mass of the sample before testing, the test results shall be rejected and further tests shall be carried out.

7. TEST RESULTS

7.1 The shatter index (SI) shall be reported as the percentage of material retained on the 10 mm and 5 mm sieves after the test. It shall be calculated by the following formula:

$$\frac{\text{SI}}{(+10)} = \frac{W_2}{W_1} \times 100$$

$$\frac{\text{SI}}{(+5)} = \frac{W_3}{W_1} \times 100$$

where

W_1 = Initial mass of the sample in kg,

W_2 = Mass of sinter retained on 10 mm mesh sieve, in kg,

W_3 = Mass of sinter retained on 5 mm mesh sieve in kg.

(*Continued from page* 2)

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IS 9963 : 1981 METHOD OF DETERMINATION OF SHATTER INDEX OF IRON ORE LUMPS, SINTERS AND PELLETS

(*Page* 4, *clause* 4.1, *line* 2) — Substitute '10' *for* '5'.

(MTD 13)

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